CHEM 101/3 Chemistry Data Sheet

2008 03 03 HT

$c = \lambda\nu$ $\quad E_{photon} = h\nu$ $\quad E_{sys} = -R_H Z^2 \frac{1}{n^2}$ $\quad KE = \frac{1}{2}mu^2$ $\quad E = mc^2$ $\quad m = \frac{h}{\lambda u}$ $\quad \Delta x \Delta(mu) \geq \frac{h}{4\pi}$

EMR spectrum: γ rays X rays Ultraviolet Visible Infrared Microwaves Radio waves

400 800 nm

$PV = nRT$ $\quad P_A = X_A P_T$ $\quad (KE)_{avg} = \frac{3}{2}RT$ $\quad u_{rms} = \sqrt{\frac{3RT}{M}}$ $\quad \left(P + \frac{an^2}{V^2}\right)(V - bn) = nRT$

simple cubic, 52.4 bcc, 68.0 fcc, 74.0 $V_{(cube)} = a^3$ $V_{(sphere)} = 4/3\ \pi r^3$

1. Periodic Table of the Elements

Values in brackets indicate the mass number of the longest lived or best known isotope.

1												13	14	15	16	17	18
1 H 1.008	2																2 He 4.003
3 Li 6.941	4 Be 9.012											5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18
11 Na 22.99	12 Mg 24.31	3	4	5	6	7	8	9	10	11	12	13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.07	17 Cl 35.45	18 Ar 39.95
19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.87	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.69	29 Cu 63.55	30 Zn 65.39	31 Ga 69.72	32 Ge 72.61	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80
37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.94	43 Tc (99)	44 Ru 101.1	45 Rh 102.9	46 Pd 106.4	47 Ag 107.9	48 Cd 112.4	49 In 114.8	50 Sn 118.7	51 Sb 121.8	52 Te 127.6	53 I 126.9	54 Xe 131.3
55 Cs 132.9	56 Ba 137.3	57 La 138.9	72 Hf 178.5	73 Ta 180.9	74 W 183.8	75 Re 186.2	76 Os 190.2	77 Ir 192.2	78 Pt 195.1	79 Au 197.0	80 Hg 200.6	81 Tl 204.4	82 Pb 207.2	83 Bi 209.0	84 Po (209)	85 At (210)	86 Rn (222)
87 Fr (223)	88 Ra (226)	89 Ac (227)	104 Rf (261)	105 Db (262)	106 Sg (266)	107 Bh (264)	108 Hs (277)	109 Mt (268)	110 Ds (281)	111 Uuu (272)	112 Uub (285)		114 Uuq (289)				

Lanthanide series	58 Ce 140.1	59 Pr 140.9	60 Nd 144.2	61 Pm (145)	62 Sm 150.4	63 Eu 152.0	64 Gd 157.3	65 Tb 158.9	66 Dy 162.5	67 Ho 164.9	68 Er 167.3	69 Tm 168.9	70 Yb 173.0	71 Lu 175.0
Actinide series	90 Th 232.0	91 Pa 231.0	92 U 238.0	93 Np (237)	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (262)

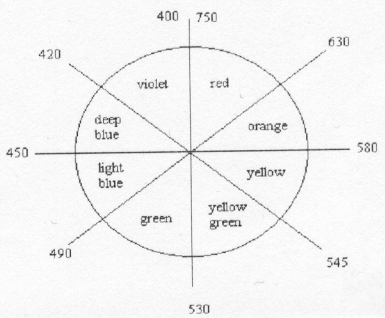
5. Pauling's Electronegativities

1												13	14	15	16	17
H 2.1	2															
Li 1.0	Be 1.5											B 2.0	C 2.5	N 3.0	O 3.5	F 4.0
Na 0.9	Mg 1.2											Al 1.5	Si 1.8	P 2.1	S 2.5	Cl 3.0
K 0.8	Ca 1.0	Sc 1.3	Ti 1.5	V 1.6	Cr 1.6	Mn 1.5	Fe 1.8	Co 1.8	Ni 1.8	Cu 1.9	Zn 1.6	Ga 1.6	Ge 1.8	As 2.0	Se 2.4	Br 2.8
Rb 0.8	Sr 1.0	Y 1.2	Zr 1.4	Nb 1.6	Mo 1.8	Tc 1.9	Ru 2.2	Rh 2.2	Pd 2.2	Ag 1.9	Cd 1.7	In 1.7	Sn 1.8	Sb 1.9	Te 2.1	I 2.5
Cs 0.8	Ba 0.9	La* 1.1	Hf 1.3	Ta 1.5	W 2.4	Re 1.9	Os 2.2	Ir 2.2	Pt 2.2	Au 2.4	Hg 1.9	Tl 1.8	Pb 1.8	Bi 1.9	Po 2.0	At 2.2
Fr 0.7	Ra 0.9	Ac† 1.1														

below 1.0; 1.0–1.4; 1.5–1.9; 2.0–2.4; 2.5–2.9; 3.0–4.0

*Lanthanides: 1.1–1.3
†Actinides: 1.3–1.5

6. Color Wheel



9. Water Vapor Pressure (torr)

0°C	4.6	21°	18.7	30°	31.8	60°	149.4
5°	6.5	22°	19.8	35°	42.2	70°	233.7
10°	9.2	23°	21.1	40°	55.3	80°	355.1
15°	12.8	24°	22.4	45°	71.9	90°	525.8
20°	17.5	25°	23.8	50°	92.5	100°	760.0

13. Miscellaneous constants

$N_A = 6.022 \times 10^{23}\ mol^{-1}$
$h = 6.626 \times 10^{-34}\ J\ s$
$c = 2.998 \times 10^{8}\ m\ s^{-1}$
$F = 96487\ C\ mol^{-1}$
$g = 9.807\ m\ s^{-2}$
$q = 1.602 \times 10^{-19}\ C$
$R_H = 2.178 \times 10^{-18}\ J$
$R = 0.08206\ L\ atm\ mol^{-1}\ K^{-1} = 8.314\ J\ mol^{-1}\ K^{-1}$
1 atm = 760 torr = 101.3 kPa
1 cal = 4.184 J